

PUBLIC HEALTH REPORTS

VOL. 48

DECEMBER 8, 1933

NO. 49

MALARIA IN NARCOTIC ADDICTS AT THE UNITED STATES PENITENTIARY ANNEX, FORT LEAVENWORTH, KANS.

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The epidemiology of malaria has taken on a new factor since March 14, 1932, when Geiger (1), in an unpublished letter to the Surgeon General of the United States Public Health Service, indicated the nonsterile hypodermic syringe as a possible agent for the transmission of malaria among narcotic addicts. Nickum (2), in May 1933, reported a similar outbreak of malaria in Omaha, Nebr., where the syringe was incriminated as the agent of transmission among habitues. More recently Faget (3) reported five probable cases of needle transmission of malaria among the addicts of New Orleans, La. Flaxman (4) reports cases of malaria among addicts in Chicago, which were probably transmitted by the hypodermic needle.

At the time of writing there are 28 inmates out of 1,596 (1.75 percent) at the United States penitentiary annex, Fort Leavenworth, Kans., who have had definite clinical and laboratory diagnoses of malaria since commitment to this institution. These men have all been interviewed, and their epidemiologic case histories automatically fall into three groups:

Group I. Those in which it is probable that the hypodermic needle was the agent of transmission.

Group II. Those in which it is possible that the needle played this role.

Group III. Recurrences.

The purpose of this investigation was twofold: First, to establish more definitely the incidence of needle transmission malaria among addicts; and, second, to determine the cause of so much malaria in this institution.

Although it is obvious that one cannot attach too much significance to case histories, it is felt that the majority of these are reliable. This was taken into consideration in classifying them. These reports have been abstracted to contain only such information as is considered essential.

Only those deemed highly probable were included in group I. Group II contains only those cases in which it is quite likely that the needle played the role of transmission agent, but could not be clearly established because of vague statements, or because *Anopheles* could not be ruled out. Those cases which had had clinical malaria at any time previously, and those whose histories were considered undependable were placed in group III.

GROUP I

Case 1.—White male, age 52, clerk, morphine addict, received June 10, 1933, from Chicago. On June 24, 1933, a clinical and laboratory diagnosis of tertian malaria was made. He had not been south nor had he had clinical malaria before. He had been confined to jail during the entire preceding year. Illegitimate narcotics were available from time to time, and at such times the drug was dissolved in bulk, introduced into a medicine dropper or syringe and this instrument was passed from man to man with no attempt at sterilization between intravenous injections. Several other addicts in the Chicago jail had chills and fever, and in December 1932, case 1 manifested the classical response to a tertian infestation.

Case 2.—White male, age 48, clerk, heroin and morphine addict, received May 27, 1933, from Chicago. A positive diagnosis of tertian malaria was made on July 4, 1933. He had been in a Chicago jail with case 1 with whom he had frequently shared "shots." He had never had clinical malaria before, although he had "followed the horses all over the country" for at least twenty years. He had never taken narcotics intravenously, always making subcutaneous or intramuscular injections. Case 1 had always used the intravenous route.

Case 3.—White male, age 52, clerk, addicted to the use of opium, morphine, and heroin, received June 10, 1933, from Chicago. A positive diagnosis of tertian malaria was made on July 11, 1933. He had never had malaria before and had never used narcotics by the intravenous route before commitment to the Chicago jail. He frequently used the same "outfit" immediately after cases 1 and 2.

Case 4.—White male, age 38, waiter, morphine and heroin addict, received December 31, 1932, from St. Paul, Minn. On February 15, 1933, a positive diagnosis of tertian malaria was made. He was committed to jail in St. Paul along with two Southern addicts, who were having chills and fever at the time. They frequently shared "shots", all of which were taken intravenously. He had never been south and had never had malaria before.

Case 5.—White male, age 38, clerk, morphine addict, received April 26, 1933, from Kansas City, Mo. On March 21, 1933, while in Kansas City, he first had chills and fever. He was treated with quinine. A week or ten days earlier he had shared his syringe with an addict who was having chills and fever every other day. Both used the intravenous route. A positive diagnosis of tertian malaria was made here May 2, 1933. He had never had symptoms of malaria before March 21, 1933.

Case 6.—White male, age 32, waiter, morphine addict, received October 31, 1931, from St. Paul, Minn. A positive diagnosis of tertian malaria was made May 17, 1932. While in jail in July 1931, in St. Paul, he used the same "outfit" used by an addict who was having chills and fever and immediately after use by the latter. Both used the intravenous route. Two weeks later, he had his first chills and fever, diagnosed as malaria, and was treated with quinine. He had never had malaria before the attack in 1931. This was his first recurrence.

Case 7.—White male, age 46, fireman, opium, morphine, and heroin addict, received October 23, 1932, from Tyler, Tex. During the autumn and fall of 1931 he was tramping with a fellow addict who was having chills and fever every three days. He broke his needle and was forced to use his friend's "outfit." One week later he began having chills and fever which responded to quinine. The first recurrence was after withdrawal here, and a positive diagnosis of quartan malaria was made December 31, 1932.

Case 8.—White male, age 20, laborer, heroin addict, received January 8, 1933, from New Orleans, La. On January 15, 1933, a positive diagnosis of estivo-autumnal malaria was made. In December 1932, while on a craw-fishing party with a number of other heroin addicts he shared intravenous "shots" with all the others. Several of them had chills and fever. The whole group had only one tin cup and one eye dropper, with needle attached, for the purpose of dissolving and administering the solution of heroin. Swamp water was used as a diluent and no attempt at sterilization was made. Several days after being committed to jail in New Orleans, he started having chills and fever. He had never had symptoms of malaria before.

It is interesting to note that this is our only case of estivo-autumnal malaria, and that four out of five of the cases reported by Faget (3) among New Orleans addicts were of the estivo-autumnal variety. Case 8 would not divulge the initials of the men with whom he had shared heroin and would not admit recognition of any of the cases reported by Faget.

GROUP II

Case 9.—Mexican male, age 28, laborer, heroin addict, received April 26, 1933, from El Paso, Tex. While in jail in El Paso, one month before having been sent here, he frequently shared "shots" with his brother, case 28, who was having chills and fever, and he shortly afterward developed them himself. He was treated with quinine. Although he had lived in a malarial country all his life, case 9 had never had malaria before. He has had one recurrence here, which was diagnosed tertian malaria May 9, 1933.

Case 10.—Negro male, age 36, morphine addict, received August 12, 1932, from Phoenix, Ariz. For a few days, about one week before having been committed to jail there, he had been sharing intravenous "shots" with a fellow addict, who was having chills and fever. He developed chills and fever while in jail. A positive diagnosis of tertian malaria was made August 22, 1932. Patient thinks he had malaria in 1911 but had had no recurrences until this time.

Case 11.—White male, age 43, showman, opium and morphine addict, received January 21, 1933, from Chicago. A positive diagnosis of quartan malaria was made here March 9, 1933. He used morphine intravenously only during the last few months of liberty, and, although he shared with others occasionally, he does not remember that any of his intimates had chills and fever. He said that he never had malaria before.

Case 12.—White male, aged 34, cook, morphine addict, received February 25, 1933, from Texas. On March 4, 1933, a positive diagnosis of tertian malaria was made. The preceding eleven months had been spent in jail at Tyler, Tex. Although he had frequently lived in malarial districts, he thinks he had never had clinical malaria. While in jail he shared intravenous "shots" with addicts who were having chills and fever and not long thereafter he had like symptoms himself.

Case 13.—White male, aged 47, gardener, native of Baton Rouge, La., morphine and heroin addict, received April 15, 1933, from New Orleans, La. A positive

diagnosis of tertian malaria was made April 29, 1933. He does not remember having had malaria previously and admits to sharing intravenous "shots" shortly before commitment. He does not know that any of his associates had malaria.

Case 14.—White male, age 57, nurse, heroin and morphine addict, received May 11, 1933, from Indianapolis, Ind. A positive diagnosis of tertian malaria was made June 1, 1933. In March he had frequently shared intravenous "shots" with several addicts in Chicago, one of whom was from the South. Withdrawal was effected while in jail in Indiana, during April 1933. He had never had malaria before and had no symptoms before his arrival here.

This man may have been associated with the group of Chicago addicts mentioned by Flaxman (4). There seems to be no doubt that malaria was present among Chicago addicts in the spring of 1933. However, the period of incubation in this case is quite long and for this reason the case is placed in group II.

GROUP III

Case 15.—White male, Italian, age 34, steam fitter, opium and morphine addict, received April 30, 1932, from Kansas City, Mo. On September 14, 1933, a positive diagnosis of tertian malaria was made. Patient thinks he had malaria in 1929 while in Oklahoma. He admits sharing intravenous "shots" before admission here, while in Kansas City, but not with known malarial addicts.

Case 16.—Indian male, age 51, tailor, cocaine and morphine addict, received from Detroit, Mich., July 14, 1930. He has not been out of this institution since that date. May 12, 1933, a positive diagnosis of tertian malaria was made. He states that he had malaria in 1923 while in Kansas City, that he had never had it before, and that he had no recognized recurrences until May 12, 1933. He feels that it is possible that he first contracted malaria through sharing the hypodermic syringe with malarial addicts, but is not sure.

Case 17.—White male, age 44, laborer; opium, morphine, and heroin addict; received April 19, 1933, from Topeka, Kans. On May 29, 1933, a positive diagnosis of tertian malaria was made. At the age of 15 he had malaria and has had no recurrence since then. Addiction has been present since the age of 19; and although he used the intravenous route, he never shared narcotics nor lent his syringe.

Case 18.—White male, age 31, dentist, morphine addict, received October 30, 1932, from New Orleans, La. On May 26, 1933, a positive diagnosis of tertian malaria was made. He has had recurrences of malaria every year as long as he can remember. He has never taken morphine intravenously, nor has he shared intravenous "shots" or lent his syringe.

Case 19.—White male, age 28, waiter, heroin addict, received February 12, 1933, from Oklahoma City, Okla. On April 26, 1933, a positive diagnosis of tertian malaria was made. He had had malaria two years before admission and had lived in malarial country all his life. He has never shared "shots," but has used the syringe after others. He does not know that any of his associates had malaria.

Case 20.—White male, age 40, fireman, heroin addict, received January 8, 1933, from Detroit, Mich. A positive diagnosis of tertian malaria was made May 12, 1933. Patient states that he had malaria in Tennessee when quite young and has had mild recurrences as long as he can remember. He has never shared intravenous "shots" with known malarial addicts.

Case 21.—White male, age 48, salesman, received here November 17, 1932, from Kansas City, Mo. A positive diagnosis of tertian malaria was made March 21, 1933. He is not an addict and never used opiates in any form. In 1908, while in South Carolina, he contracted malaria and has had frequent recurrences since then.

Case 22.—White male, age 39, clerk, addicted to the use of opium, heroin, and morphine, received February 5, 1933, from Detroit, Mich. On March 1, 1933, a positive diagnosis of tertian malaria was made. He states that 10 years previously he developed malaria while in the South and has had it "off and on" ever since then. He takes narcotics intravenously sometimes and has shared "shots" frequently, but never, to his knowledge, with malarial addicts and does not know of any cases of malaria which resulted from contamination of the syringe by his blood.

Case 23.—White male, age 39, salesman, heroin and morphine addict, received June 21, 1933, from Mobile, Ala. On July 10, 1933, a positive diagnosis of tertian malaria was made. He first had malaria in 1918, while in Italy, and has had no recurrences since then. During the past year he has been using narcotics intravenously but has never shared "shots" and has been very careful about sterilizing his syringe.

Case 24.—White male, age 28, bookkeeper, morphine and heroin addict, received January 26, 1933, from El Paso, Tex. A positive diagnosis of tertian malaria was made February 6, 1933. He had had malaria "off and on" for two or three years before coming here, which he thinks he contracted while in western Louisiana and eastern Texas. Although he uses the intravenous route, he has never lent his syringe nor shared "shots."

Case 25.—White male, age 28, carpet layer, morphine addict, received July 31, 1932, from Fort Worth, Tex. On February 2, 1933, a positive diagnosis of tertian malaria was made. He has had malaria before and has had recurrences within the last two years. He uses the intravenous route but has never shared any "shots" and does not recall having ever used a syringe without sterilizing it.

Case 26.—White male, age 39, cook, morphine addict, received December 17, 1929, from the United States Penitentiary, McNeil's Island. Diagnoses of malaria were made June 4, 1930, and October 11, 1930. Previous to his sentence here he had been in prison in California for 5 years and during this whole period had never received any narcotics. He does not think he ever had malaria before 1930.

Case 27.—White male, age 35, boilermaker, cocaine and heroin addict, received January 8, 1933, from Detroit, Mich. On January 13, 1933, a positive diagnosis of quartan malaria was made. Patient does not think he ever had malaria before. He has never been South. He denies sharing intravenous "shots" and has never known anyone who had malaria. He became ill in June 1932, in Detroit, and the illness was diagnosed as typhoid fever in Henry Ford Hospital. He thinks he might have had malaria at the same time.

Case 28.—Mexican male, age 28, heroin addict, received June 10, 1933, from El Paso, Tex. A positive diagnosis of tertian malaria was made June 12, 1933. He had malaria in 1929 and had his first recurrence while in jail in El Paso before being sent here. He was given some quinine while there.

Case 29.—White male, age 22, laborer, morphine addict, received January 31, 1932, from Texas. While working in a construction camp he contracted malaria; and since quinine seemed to be ineffective in his case, he resorted to and later became addicted to the use of opiates. He has never had any symptoms of malaria since that time.

DISCUSSION

It seems to be rather definitely established that the transmission of malaria among narcotic addicts does occur through the medium of the hypodermic needle. The term "hypodermic" is not used here in its strictest sense, since most of the cases resort to the intravenous route. The sharing of "shots", the lack of sterilization between injections, and the use of the intravenous technique by the "donor" appear to be essential conditions for "needle" transmission of malaria. It would seem that the "recipient" may make subcutaneous or intramuscular injections.

Case 29 brought out the interesting possibility that narcotics taken in large quantities might be toxic to the malaria plasmodium. Several known malarial addicts stated that they had recurrences only during abstinence. Considerable doubt is thrown on this hypothesis by Macht and Fisher (5) (1917) and later by Bills and Macht (1924), who found the morphine group relatively ineffective against protozoa. Macht and Weiner (6) (1918) found both the papaverine and morphine groups to be inefficient, *in vivo* (rats), against *Trypanosoma brucei* infestation. Pick and Wasiky (7) found papaverine to be ineffective against amebic dysentery. It is no doubt true that continued use of opiates may control the symptoms to a large extent, but it is not likely that opiates exert any depressant action on the plasmodium. It has been observed (8) that resistance to infection is low during withdrawal.

Among the cases in group III will be noted several who deny previous malaria or who have not had recurrences for many years (15, 16, 17, 23, 26, and 27). Reinfection from fresh cases was considered. A few mosquitoes were caught in one of the cell houses and one of these was an *Anopheles quadrimaculatis*. None was noticed before May 1, 1933; and altogether not more than four have been seen. Since we have present the human reservoir, this might account for some of the cases in group III.

TABLE 1.—Data indicating possible association among certain cases

Type of disease and case number	Wing number	Date of admission	Date of diagnosis	Type of disease and case number	Wing number	Date of admission	Date of diagnosis
Tertian:				Tertian—Con.			
25.....	7	July 31, 1932	Feb. 2, 1933	18.....	4	Oct. 30, 1932	May 26, 1933
24.....	4	Jan. 26, 1933	Feb. 6, 1933	17.....	6	Apr. 19, 1933	May 29, 1933
4.....	4	Dec. 31, 1932	Feb. 15, 1933	14.....	4	May 11, 1933	June 1, 1933
22.....	6	Feb. 5, 1933	Mar. 1, 1933	1.....	6	June 10, 1933	June 24, 1933
12.....	6	Feb. 25, 1933	Mar. 4, 1933	2.....	6	May 21, 1933	July 4, 1933
21.....	6	Nov. 17, 1932	Mar. 21, 1933	3.....	6	June 10, 1933	July 11, 1933
19.....	6	Feb. 12, 1933	Apr. 26, 1933	23.....	6	July 21, 1933	Aug. 10, 1933
13.....	6	Apr. 15, 1933	Apr. 29, 1933	15.....	4	Apr. 30, 1932	Sept. 14, 1933
5.....	4	Apr. 26, 1933	May 2, 1933	Quartan:			
9.....	6	Apr. 26, 1933	May 9, 1933	7.....	6	Oct. 23, 1932	Dec. 31, 1932
20.....	7	Jan. 8, 1933	May 12, 1933	27.....	4	Jan. 8, 1933	Jan. 13, 1933
16.....	6	July 14, 1930	May 12, 1933	11.....	6	Jan. 21, 1933	Mar. 9, 1933

The facts presented in table 1 indicate a possible association among some of the cases. The incidence of cases in wing 6 was high from February 2, 1933, to September 14, 1933. Since the mosquito season is over at the time of this report it will be impossible to determine this year whether they were carrying the infestation or not. The question of penitentiary irregularities naturally arises, but these were not investigated.

Since several cases came here from Illinois, Michigan, and Missouri, it was interesting to note the reported (9) incidence of malaria in these States, from December 1932 through March 1933, as shown in table 2. There is also shown the incidence of cases of malaria diagnosed after arrival, in inmates who had come from those States during the period indicated.

TABLE 2.—*Incidence of malaria in Illinois, Michigan, and Missouri*

	Illinois	Michigan	Missouri
December 1932.....	3	5	3
January 1933.....	3	2	1
February 1933.....	1	1	0
March 1933.....	1	3	0
Total.....	8	11	4
Cases ¹	2	3	1

¹ Cases of malaria detected at the United States penitentiary annex in which the patient had either been received from these States or had contracted the disease there during the period indicated.

It appears that the incidence of drug addiction in cases of "off season" malaria in these States is high, especially when one considers that each one of our cases must have contracted the disease from a fellow malarial addict there.

SUMMARY

The incidence of malaria in the United States penitentiary annex, Fort Leavenworth, Kans., indicated an epidemiologic survey. Out of a total population of 1,596, twenty-eight (1.75 percent) have had malaria since their commitment here—25 since December 31, 1932. Eight cases (28.6 percent of the cases) very probably resulted from needle transmission, and in six cases (21.4 percent) this was quite possible; while 14 cases (50 percent) were either recurrent or unexplained. The presence of the *Anopheles* probably accounts for some of them; but, unfortunately, no mosquitoes were available for dissection at the time of the report.

It appears that the incidence of malaria in nonmalarial districts, in the "off season" can be accounted for in many instances by needle transmission among narcotic addicts. We plan to make malaria concentration smears on all new admissions. Narcotic addicts in general should be warned of the malaria hazard and the mode of transmission as a preventive measure against an epidemic.

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THE SPECIFICITY OF IMMUNITY ELICITED BY MOUSE SARCOMA 180

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In a previous communication (1), evidence was presented showing that a single caudal inoculation of mouse sarcoma 180 induces concomitant immunity in about 60 percent of adult female stock mice. In addition, it was shown that mice immune to sarcoma 180 are also immune to adenocarcinoma 63. Hence, the immunity is not specific. The present report deals with the continuation of studies bearing on cross-immunity between sarcoma 180 and other transplantable mouse tumors, and with experiments pertaining to concomitant immunity elicited in mice following caudal inoculation of tumors other than sarcoma 180.

TUMOR STRAINS, EXPERIMENTAL ANIMALS, AND METHODS

Four strains of mouse tumors were utilized in these experiments. The first, sarcoma 180, is characterized by its remarkable power of proliferation in practically all strains of mice. The second, sarcoma 37 (2), arose in the stroma of a transplantable carcinoma and is known as an extremely rapidly growing tumor. The third, carcinoma 206 (3), is noted for its high percentage of spontaneous regression, after attaining considerable size. Sarcoma 37 and carcinoma 206 were selected for these studies because Russell (4) has shown that both possess the power of inducing a high degree of concomitant resistance. The fourth tumor strain, an adenocarcinoma, was discovered in this laboratory as a spontaneous tumor arising within a female stock mouse of unknown ancestry. The original growth was transplanted by grafts into 19 mice, of which 2 developed tumors. Transplants from one of these were successful in 14 out of 15 mice. The tumor retained

this high proliferative power during 27 consecutive passages, during which tumors grew progressively in 95 percent of all inoculated animals, rarely metastasized, and usually killed the mice within 6 to 8 weeks.

With the conclusion of the 27 passages, the tumor suddenly lost its malignancy; and, in spite of efforts to enhance its growth energy by using young animals, embryo mash, and very susceptible strains of mice, it was lost during the thirty-eighth passage. All the experiments recorded in this communication wherein this tumor was used were performed during the first 27 passages, when the tumor was extremely malignant. It is referred to as carcinoma A in the present paper.

Only adult female albino mice purchased from dealers were used in these experiments. In order to exclude variations in susceptibility as far as possible, animals from the same shipment were always used as controls.

The technique for tail inoculation has been described in detail elsewhere (1). Pieces of actively growing tumor were passed through a mincing machine and inserted into the tails of mice by means of a 1-cc tuberculin syringe and an 18-gage needle. Subcutaneous inoculation in the groin by the usual trocar technique was employed when testing for immunity. Any mouse surviving two such tests was considered immune.

EXPERIMENTAL OBSERVATIONS

CROSS-IMMUNITY EXPERIMENTS BETWEEN SARCOMA 180 AND CARCINOMA A

Experiment 1.—Twenty-two mice that had been inoculated caudally with sarcoma 180 and had survived two subsequent tests for immunity in the right groin were each reinoculated in the right groin with sarcoma 180 and at the same time given transplants of carcinoma A in the left groin. Twenty proved to be resistant to both tumors, while two grew the carcinoma only. The normal controls all grew sarcoma 180, and 9 of 10 normal controls developed carcinoma A.

Experiment 2.—Nineteen mice immunized to sarcoma 180, as described in experiment 1, were inoculated in the right groin with sarcoma 180 and in the left groin with carcinoma A. Fifteen were negative to both inoculations; 1 developed a tumor in both groins; 3 grew the carcinoma only. Ten normal control animals for sarcoma 180 were all positive, while 11 of 12 normal controls for carcinoma A developed progressively growing tumors.

It is seen in the two foregoing experiments that of 40 mice immune to sarcoma 180, 35 were also resistant to carcinoma A. In order to ascertain whether carcinoma A was capable of inducing concomitant immunity and, if so, whether the immunity was effective against sarcoma 180, the following experiments were performed.

Experiment 3.—Thirty mice were inoculated caudally with carcinoma A. All developed definite tumors within 2 weeks. The tails of these animals were not amputated, because the tumors had not attained sufficient size to warrant the procedure. In fact, every caudal growth had regressed completely 2 months after inoculation. This result confirmed the earlier findings (1) in respect to sarcoma 180, namely, that the tail was not so favorable a site as the groin for progressive growth of tumors. Two, and again at four, weeks after caudal inoculation the mice were tested for immunity in the usual manner. Of 29 survivors, 17 proved to be resistant. Of 24 normal control mice for the immunity tests, 22 were positive.

This experiment was repeated twice with the same results, so far as the appearance and regression of tail tumors were concerned. Forty-seven mice received the immunity test, of which 29 were immune. Of 48 normal controls for the tests, 44 responded with tumor growth.

The results of the three experiments show that the growth of carcinoma A within the tails of mice induced concomitant immunity in about 60 percent of the experimental animals.

The foregoing experiments yielded 46 mice immune to carcinoma A, which were tested for immunity to sarcoma 180 by groin inoculation. Only 6 of the animals were resistant to the sarcoma.

In another group of 3 experiments, 48 mice bearing 2-week-old carcinoma A in one groin were inoculated in the opposite groin with sarcoma 180. None was immune. Referring back to the experiments wherein the mice received an initial tail inoculation of carcinoma A, which receded, and two subsequent groin implantations of the same tumor for immunity tests, it is seen that about 13 percent were immune to sarcoma 180. The fact that none of the mice receiving but one inoculation of carcinoma A was immune to sarcoma 180 indicates that regression of caudal tumors, together with two subsequent groin implantations of carcinoma A, increased the resistance of the mice to such an extent that a few were also immune to the sarcoma.

CROSS-IMMUNITY EXPERIMENTS BETWEEN SARCOMA 180 AND CARCINOMA 206

Studies pertaining to the immunological relationship between sarcoma 180 and carcinoma 206 will not be described in detail, since they gave results similar to those obtained between sarcoma 180 and carcinoma A. In dealing with the ability of sarcoma 180 to immunize against carcinoma 206, three experiments were performed, in which a total of 60 mice resistant to sarcoma 180 were inoculated with carcinoma 206. It was found that 13, or about 20 percent, were not immune to the carcinoma.

Carcinoma 206 grew within the tails of mice and, similar to the action of carcinoma A, practically all the caudal growths receded.

In three experiments caudal growth of carcinoma 206 elicited concomitant immunity in 46 of 65 experimental animals. Thus, the earlier findings of Russell (4) were confirmed. However, of the 46 mice immune to carcinoma 206, only 6 were resistant to inoculation of sarcoma 180.

It is obvious that sarcoma 180 induces resistance to the two carcinomas, but neither carcinoma is able to immunize animals to such a degree that an appreciable number are also resistant to grafts of sarcoma 180.

CROSS-IMMUNITY EXPERIMENTS BETWEEN SARCOMA 180 AND SARCOMA 37

Experiment 4.—Sixty-five mice were inoculated caudally with sarcoma 180. Two weeks after inoculation, all the mice had large tail tumors. Their tails were then amputated and each mouse received a transplant of sarcoma 180 in the right groin. Two weeks later all the mice remaining tumor-free were given another implant of sarcoma 180 in the right groin. Thirty-nine of the animals were resistant to both test inoculations. These were inoculated in the left groin with sarcoma 37. Only 10 were immune.

The experiment was repeated twice and similar results were obtained. The material consisted of 120 mice, of which 88 were rendered immune to sarcoma 180. However, when tested for immunity to sarcoma 37, only 18 of these were found to be resistant. Thus, of 127 mice immune to sarcoma 180, only 28, or 22 percent, were also resistant to sarcoma 37.

Experiment 5.—Sixty-five mice were inoculated in the tail with sarcoma 37, and all developed tumors. Sarcoma 37 is noted for its rapidity of growth following subcutaneous inoculation, and the same may be said for its proliferative ability in the mouse's tail. Furthermore, the tail tumors have a pronounced tendency to extend beyond the base of the tail and invade the tissues of the posterior dorsal region. In this experiment 20 mice were discarded because of such extensions. Of the remaining 45 animals, 23 were immune to 2 inoculations of sarcoma 37 in the right groin.

In two subsequent experiments 56 mice were tested for immunity to sarcoma 37 following amputation of their tail tumors; 34 were immune. It is seen that growth of sarcoma 37 in the tails of mice induces concomitant resistance in about 60 percent of the animals.

All of these animals (57) immune to sarcoma 37 were given transplants of sarcoma 180 in the left groin. Only 4 were immune.

The foregoing results with the two sarcomas show that both elicit a fair degree of immunity against themselves, but neither is capable of producing any pronounced resistance against the other. It would appear as though sarcoma 180 induces a higher degree of immunity in mice than sarcoma 37.

SUMMARY

Acquired immunity induced by propagable tumors is known to be effective against other transplantable growths. The purpose of the experiments recorded in this paper was to continue the earlier investigations pertaining to the specificity of immunity elicited by sarcoma 180. The results attending the previous investigation (1) and those recorded in this communication may be summarized as follows:

1. Sarcoma 180 induces resistance in mice which is effective against carcinoma A, carcinoma 63, and carcinoma 206.
2. It fails to induce any pronounced resistance to sarcoma 37.
3. The growth of carcinoma A, carcinoma 206, or sarcoma 37 in the mouse's tail elicits concomitant immunity in a considerable percentage of animals. However, the resistance induced by any of these tumors is not effective against sarcoma 180.

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COURT DECISION RELATING TO PUBLIC HEALTH

City held liable for loss of fish in hatchery through pollution of stream.— (Washington Supreme Court; *Bales v. City of Tacoma*, 20 P. (2d) 860; decided Apr. 11, 1933.) The plaintiff, an operator of a fish hatchery, brought an action against the city of Tacoma to recover damages for the loss of fish through alleged contamination of the waters of a stream feeding his hatchery and to enjoin the continuation of the alleged nuisance causing the contamination. It was claimed that the stream was contaminated by sewage and garbage disposed of by the city. The trial court, sitting without a jury, awarded damages to the plaintiff and decreed injunctive relief. The supreme court, on appeal, sustained this action of the lower court. Portions of the appellate court's opinion follow:

* * * After a careful consideration of all the evidence, we are forced to the conclusion that the findings of the court in respect to the city's maintaining a nuisance are well supported by the evidence and furnish no ground for disturbance on appeal. [Case cited.]

Appellant contends that the damages allowed by the court are excessive. The court allowed nothing for loss of use of the hatchery. The damages were confined strictly to the loss of fish, and the amount allowed is well within the evidence.

* * * That the respondent was damaged in fact is not disputed; that the damage was occasioned by appellant is supported by the preponderance of the

evidence as found by the court; and that the amount was rested upon evidence of reasonable certainty we have no doubt. * * *

By our decisions we are committed to the rule that an injured party may maintain an equitable action to abate such nuisance [a public nuisance which is specially injurious to a private person]. [Cases cited.]

A municipal corporation is not immune from an action for damages nor from one to abate a nuisance. [Citations.]

The injuries sustained by respondent were special to himself, differing from those affecting the general public. He was, therefore, entitled to maintain this action upon both its causes.

Appellant makes some suggestion in its brief that, because the city has used the swamp for garbage and, in part, for sewage purposes for many years, the respondent cannot now interfere with its established practice. We think that the suggestion has two answers: (1) A city cannot by prescription or lapse of time acquire the right to maintain a nuisance. [Citations.] (2) The evidence shows that the city has, from time to time and recently, increased the amount of sewage and garbage which found its outlet into the waters of Flett Creek. Excess of pollution produced by the continuation of a nuisance is subject to injunctive process. * * *

DEATHS DURING WEEK ENDED NOV. 18, 1933

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Nov. 18, 1933	Correspond- ing week 1932
Data from 85 large cities of the United States:		
Total deaths.....	8, 160	7, 687
Deaths per 1,000 population, annual basis.....	11. 4	11. 0
Deaths under 1 year of age.....	594	622
Deaths under 1 year of age per 1,000 estimated live births (81 cities).....	52	51
Deaths per 1,000 population, annual basis, first 46 weeks of year.....	10. 8	11. 0
Data from industrial insurance companies:		
Policies in force.....	67, 464, 735	69, 914, 948
Number of death claims.....	13, 283	13, 548
Death claims per 1,000 policies in force, annual rate.....	10. 3	10. 1
Death claims per 1,000 policies, first 46 weeks of year, annual rate.....	9. 7	9. 5

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended Nov. 25, 1933, and Nov. 26, 1932

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Nov. 25, 1933, and Nov. 26, 1932

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 25, 1933	Week ended Nov. 26, 1932	Week ended Nov. 25, 1933	Week ended Nov. 26, 1932	Week ended Nov. 25, 1933	Week ended Nov. 26, 1932	Week ended Nov. 25, 1933	Week ended Nov. 26, 1932
New England States:								
Maine.....	3	4	1	1	2	2	0	0
New Hampshire.....	2				75	1	0	0
Vermont.....	4	4			58	1	0	0
Massachusetts.....	28	43		2	387	68	2	2
Rhode Island.....		6	1				0	0
Connecticut.....	14	8		10	13	6	0	1
Middle Atlantic States:								
New York.....	47	65	17	19	370	345	5	4
New Jersey.....	24	21	23	14	30	89	0	0
Pennsylvania.....	73	108			231	246	4	4
East North Central States:								
Ohio.....	97	90	3	6	58	143	0	1
Indiana.....	108	85	34	48	28	7	1	2
Illinois.....	41	89	30	52	23	58	5	12
Michigan.....	34	20	2	3	19	230	2	3
Wisconsin.....	4	3	17	26	56	148	3	2
West North Central States:								
Minnesota.....	16	10			23	74	0	1
Iowa.....	12	14			3		1	0
Missouri.....	90	46	8	2	42		3	2
North Dakota.....	10	5	1		8	115	0	0
South Dakota.....	1	11		1	202		1	0
Nebraska.....	7	22	8		17		0	0
Kansas.....	27	25		8	3	2	1	2
South Atlantic States:								
Delaware.....	1	3			2	2	0	0
Maryland.....	22	12	11	15	2	3	1	1
District of Columbia.....	22	4		3	9		0	0
Virginia.....	124	69			24	61	0	1
West Virginia.....	80	62	52	85	16	97	1	1
North Carolina.....	108	53	26	15	271	51	1	1
South Carolina.....	24	17	393	469	56	4	0	0
Georgia.....	69	49			243		2	0
Florida.....	14	39	2	2	1		0	0
East South Central States:								
Kentucky.....	96	107		89	4		1	1
Tennessee.....	68	84	63	169	220	4	1	4
Alabama.....	102	42	37	1,940	14	3	1	2
Mississippi.....	28	24					1	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Nov. 25, 1933, and Nov. 26, 1932—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 25, 1933	Week ended Nov. 26, 1932	Week ended Nov. 25, 1933	Week ended Nov. 26, 1932	Week ended Nov. 25, 1933	Week ended Nov. 26, 1932	Week ended Nov. 25, 1933	Week ended Nov. 26, 1932
West South Central States:								
Arkansas.....	29	30	9	111	232	1	0	0
Louisiana ²	49	32	9	600	9	1	1	1
Oklahoma ⁴	89	53	25	47	50	6	1	0
Texas ²	311	171	146	73	11	1	0	0
Mountain States:								
Montana.....			11	27	2	138	0	0
Idaho.....		6		28	2	4	1	0
Wyoming.....	1				31	1	0	1
Colorado.....	7	5	29			6	0	0
New Mexico.....	10	15	6	22	30		0	9
Arizona.....	3	7	27	479	6	1	0	0
Utah ²		3	8	146	123	1	0	1
Pacific States:								
Washington.....		8	3	1	52		0	0
Oregon.....	1	3	25	112	9	40	1	0
California.....	39	71	63	1,721	126	41	3	3
Total	1,939	1,648	1,107	6,306	3,193	2,001	44	62

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Nov. 25, 1933	Week ended Nov. 26, 1932	Week ended Nov. 25, 1933	Week ended Nov. 26, 1932	Week ended Nov. 25, 1933	Week ended Nov. 26, 1932	Week ended Nov. 25, 1933	Week ended Nov. 26, 1932
New England States:								
Maine.....	4	0	9	13	0	0	3	4
New Hampshire.....	0	0	17	12	0	0	0	1
Vermont.....	1	0	6	7	0	0	0	0
Massachusetts.....	1	0	223	242	0	0	0	2
Rhode Island.....	0	0	12	25	0	0	1	0
Connecticut.....	0	0	71	64	0	0	1	1
Middle Atlantic States:								
New York.....	6	4	361	463	0	0	12	13
New Jersey.....	0	1	125	156	0	0	5	5
Pennsylvania.....	8	6	464	542	0	0	27	23
East North Central States:								
Ohio.....	2	2	472	641	1	2	7	12
Indiana.....	0	1	172	93	4	2	3	4
Illinois.....	1	3	426	354	0	1	18	11
Michigan.....	1	1	281	251	0	0	11	3
Wisconsin.....	3	0	97	68	24	1	3	14
West North Central States:								
Minnesota.....	2	0	83	77	1	0	2	2
Iowa.....	1	0	63	41	3	12	0	0
Missouri.....	0	0	200	72	3	0	4	4
North Dakota.....	0	0	52	22	0	14	0	0
South Dakota.....	0	0	2	8	0	1	0	2
Nebraska.....	1	1	28	31	11	2	0	0
Kansas.....	1	0	142	85	0	1	5	4
South Atlantic States:								
Delaware.....	0	0	6	3	0	0	1	0
Maryland ²	1	2	93	71	0	0	14	4
District of Columbia.....	0	0	21	16	0	0	1	1
Virginia.....	1	3	170	84	0	0	9	21
West Virginia.....	3	0	141	82	3	0	2	15
North Carolina ²	3	1	191	94	0	0	7	14
South Carolina ²	1	1	22	14	0	1	11	5
Georgia ²	5	1	17	22	0	3	9	10
Florida.....	0	0	7	4	0	0	0	0
East South Central States:								
Kentucky.....	3	4	113	128	0	0	11	34
Tennessee.....	0	3	139	59	7	7	17	20
Alabama ²	2	1	55	46	0	0	20	8
Mississippi.....	1	0	23	30	2	1	2	1

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Nov. 25, 1933, and Nov. 26, 1932—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Nov. 25, 1933	Week ended Nov. 26, 1932	Week ended Nov. 25, 1933	Week ended Nov. 26, 1932	Week ended Nov. 25, 1933	Week ended Nov. 26, 1932	Week ended Nov. 25, 1933	Week ended Nov. 26, 1932
West South Central States:								
Arkansas	2	0	27	50	0	0	5	5
Louisiana ¹	0	0	27	16	0	1	18	1
Oklahoma ²	1	1	39	53	1	8	21	8
Texas ³	3	0	100	117	15	1	28	8
Mountain States:								
Montana	2	0	17	13	0	0	2	2
Idaho	2	0	6	0	7	2	1	1
Wyoming	0	0	13	9	0	0	0	1
Colorado	0	0	28	27	1	1	3	7
New Mexico	1	0	25	4	0	0	13	1
Arizona	1	0	17	5	1	0	0	0
Utah ⁴	0	0	8	12	0	9	1	0
Pacific States:								
Washington	2	5	44	24	3	6	18	8
Oregon	4	1	49	31	2	0	1	2
California	4	1	248	159	18	2	18	9
Total	74	43	4,962	4,440	107	66	330	291

¹ New York City only.

² Week ended earlier than Saturday.

³ Typhoid fever, week ended Nov. 25, 1933, 70 cases, as follows: North Carolina, 1; South Carolina, 1; Georgia, 31; Alabama, 13; Louisiana, 1; Texas, 23.

⁴ Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of monthly State reports is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
Alabama	2	310	129	1,279	28	81	1	192	0	51
Georgia	2	251	199	778	141	26	3	99	0	63
Idaho		4	1		3		2	16	10	3
Illinois	16	184	49	54	57	3	37	1,063	1	101
Louisiana	3	174	24	649	6	15	1	67	1	81
New Hampshire		2					3	64	0	3
Oklahoma ¹	1	304	77	280	59	4	3	115	10	128
Oregon		3	80	1	54		8	131	12	17
Pennsylvania	15	305		4	287	3	70	1,357	0	205
Rhode Island		7	3	3	2		3	42	0	5
Virginia	1	513	271	74	8	15	9	564	0	98

¹ Exclusive of Oklahoma City and Tulsa.

² Imported.

October 1933		October 1933—Contd.		October 1933—Contd.	
Disease	Cases	Disease	Cases	Disease	Cases
Anthrax:		Dysentery—Continued:		Lethargic encephalitis:	
Pennsylvania	2	Illinois (bacillary)	22	Alabama	5
Chicken pox:		Louisiana	8	Georgia	3
Alabama	14	Oklahoma ¹	22	Illinois	60
Georgia	10	Pennsylvania	5	Oklahoma ¹	5
Idaho	28	Virginia	40	Oregon	1
Illinois	483	German measles:		Pennsylvania	21
Louisiana	2	Illinois	21	Virginia	3
Oklahoma ¹	11	Pennsylvania	14	Milk sickness:	
Oregon	58	Hookworm disease:		Illinois	1
Pennsylvania	1,006	Georgia	494	Mumps:	
Rhode Island	14	Louisiana	47	Alabama	6
Virginia	88	Impetigo contagiosa:		Georgia	8
Dysentery:		Oklahoma ¹	7	Illinois	164
Georgia (amoebic)	5	Oregon	92	Louisiana	4
Georgia (bacillary)	6	Lead poisoning:		Oklahoma ¹	128
Illinois (amoebic)	30	Illinois	2	Oregon	8
				Pennsylvania	40

¹ Exclusive of Oklahoma City and Tulsa.

October 1933—Contd.		October 1933—Contd.		October 1933—Contd.	
Mumps—Continued.	Cases	Scabies:	Cases	Typhus fever:	Cases
Rhode Island	1	Oregon	66	Alabama	75
Virginia	106	Septic sore throat:		Georgia	76
Ophthalmia neonatorum:		Georgia	28	Virginia	2
Alabama	1	Illinois	17	Undulant fever:	
Georgia	1	Louisiana	2	Alabama	1
Illinois	2	Oklahoma ¹	17	Georgia	3
Oklahoma ¹	1	Oregon	5	Idaho	3
Pennsylvania	11	Rhode Island	3	Illinois	8
Virginia	1	Virginia	10	Louisiana	2
Paratyphoid fever:		Tetanus:		Oklahoma ¹	2
Georgia	1	Alabama	7	Oregon	2
Illinois	2	Illinois	7	Pennsylvania	4
Louisiana	1	Louisiana	6	Rhode Island	4
Oregon	1	Pennsylvania	7	Virginia	3
Virginia	3	Virginia	4	Vincent's infection:	
Puerperal septicemia:		Trachoma:		Illinois	57
Illinois	3	Georgia	31	Oklahoma	4
Oregon	1	Illinois	3	Oregon	4
Pennsylvania	15	Oklahoma ¹	14	Whooping cough:	
Rabies in animals:		Oregon	1	Alabama	52
Illinois	10	Virginia	1	Georgia	72
Louisiana	26	Tularaemia:		Illinois	509
Oregon	1	Georgia	1	Louisiana	10
Rabies in man:		Illinois	2	Oklahoma ¹	15
Alabama	1	Pennsylvania	1	Oregon	32
Rocky Mountain spotted fever:		Virginia	4	Pennsylvania	1,180
Oregon	1			Rhode Island	128
				Virginia	128

¹ Exclusive of Oklahoma City and Tulsa.

WEEKLY REPORTS FROM CITIES

City reports for week ended Nov. 18, 1933

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Small-pox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths all causes
		Cases	Deaths								
Maine:											
Portland	0	1	0	2	3	1	0	0	0	0	34
New Hampshire:											
Concord	0	0	0	1	2	0	0	0	0	0	12
Manchester	0	0	0	4	1	0	0	0	0	0	11
Nashua	0	0	0	0	0	4	0	0	0	8	0
Vermont:											
Barre	0	0	0	0	0	3	0	0	0	5	6
Massachusetts:											
Boston	5	1	66	23	32	0	9	1	63	218	
Fall River	1	1	0	2	1	0	1	0	1	32	
Springfield	0	0	2	1	1	0	3	0	23	31	
Worcester	1	0	194	4	6	0	5	0	33	57	
Rhode Island:											
Pawtucket	1	0	0	0	1	0	0	0	0	18	
Providence	1	0	0	1	9	0	9	0	29	57	
Connecticut:											
Bridgeport	0	1	1	0	1	0	1	0	6	23	
Hartford	2	1	0	0	3	23	0	0	2	36	
New Haven	2	0	0	4	1	0	0	1	5	25	
New York:											
Buffalo	5	0	34	5	14	0	4	0	23	122	
New York	21	15	14	16	169	79	81	6	100	1,531	
Rochester	1	0	0	3	15	0	0	1	19	55	
Syracuse	0	0	0	6	2	0	2	0	63	59	
New Jersey:											
Camden	3	0	0	6	10	0	0	0	0	29	
Newark	1	7	1	4	15	6	6	0	22	104	
Trenton	0	2	1	0	3	4	0	1	3	36	
Pennsylvania:											
Philadelphia	2	10	3	94	47	58	16	2	32	489	
Pittsburgh	14	2	3	1	14	38	1	0	48	146	
Reading	0	0	19	2	0	0	0	0	3	26	
Ohio:											
Cincinnati	4	1	3	24	5	19	0	7	6	123	
Cleveland	6	58	1	3	10	36	0	2	49	153	
Columbus	4	0	1	6	6	33	0	2	2	101	
Toledo	3	1	1	3	7	35	0	2	6	57	

City reports for week ended Nov. 18, 1933—Continued

State and city	Diph- theria cases	Influenza		Meas- sles cases	Pneu- monia deaths	Scar- let fever cases	Small- pox cases	Tuber- culosis deaths	Ty- phoid fever cases	Whoop- ing cough cases	Deaths all causes
		Cases	Deaths								
Indiana:											
Fort Wayne	4		0	0	4	4	0	0	0	0	20
Indianapolis	5		0	1	13	6	0	3	0	14	
South Bend	0		0	1	0	9	0	1	0	0	10
Terre Haute	13		0	2	1	1	0	2	0	1	17
Illinois:											
Chicago	0	9	4	7	50	131	0	42	0	78	702
Springfield	8		0	0	0	4	0	0	0	0	18
Michigan:											
Detroit	14	2	2	6	21	60	0	19	2	60	221
Flint	0	0	5	1	1	23	0	0	2	6	21
Grand Rapids	0	0	0	0	2	10	0	1	0	0	31
Wisconsin:											
Kenosha	0		0	0	0	7	0	0	0	5	5
Madison	0		0	0	2	2	0	0	0	20	19
Milwaukee	4	1	1	3	0	11	0	0	0	51	85
Racine	0	0	0	0	0	5	0	0	0	4	5
Superior	0		0	0	0	0	0	0	0	5	6
Minnesota:											
Duluth	0		1	0	3	2	0	0	0	2	27
Minneapolis	6		0	0	3	20	0	0	0	18	102
St. Paul	0	2	2	0	3	10	0	1	2	13	44
Iowa:											
Des Moines	3			0		17	0		0	0	32
Sioux City	2			1		2	0		0	1	
Waterloo	0			0		0	0		0	5	
Missouri:											
Kansas City	4		0	3	12	29	0	6	0	2	110
St. Joseph	2		0	1	5	2	0	2	0	0	20
St. Louis	21	1		16	8	27	0	10	2	22	193
North Dakota:											
Fargo	2		0	2	0	1	0	0	0	0	0
Grand Forks	0			0		0	0	0	0	0	0
South Dakota:											
Aberdeen	0			0		0	0	0	0	0	0
Sioux Falls	0			0		0	0	0	0	0	7
Nebraska:											
Omaha	1		0	6	3	12	5	2	0	8	46
Kansas:											
Topeka	0		0	0	0	7	0	0	0	3	3
Wichita	1		0	0	1	5	0	1	1	1	19
Delaware:											
Wilmington	1		0	0	3	1	0	2	0	1	32
Maryland:											
Baltimore	3		1	4	21	25	0	15	1	55	253
Cumberland	5		0	0	2	8	0	0	2	3	21
Frederick	0		0	0	0	3	0	0	0	0	4
District of Columbia:											
Washington	12		0	11	16	17	0	8	3	0	167
Virginia:											
Lynchburg	3		0	0	1	1	0	2	0	2	11
Norfolk	2		0	0	0	5	0	0	0	0	28
Richmond	10		0	0	2	14	0	4	0	0	57
Roanoke	6		0	0	0	12	0	0	0	0	13
West Virginia:											
Charleston	6	2	0	0	2	4	0	0	0	0	12
Huntington	6					16	2		0	0	
Wheeling	0		0	1	3	7	0	1	1	0	21
North Carolina:											
Raleigh	2		0	1	1	9	0	0	0	2	1
Wilmington	0		0	0	1	2	0	0	0	0	13
Winston-Salem	16	1	1	66	2	9	0	1	0	0	18
South Carolina:											
Charleston	1	17	0	0	2	1	0	2	0	2	25
Columbia	0		0	0	0	0	0	2	0	0	13
Greenville	0		0	0	1	2	0	0	0	8	2
Georgia:											
Atlanta	21	10	4	0	7	6	0	5	0	2	88
Brunswick	0		0	1	1	0	0	0	0	0	7
Savannah	3	1	0	0	1	0	0	0	1	0	33
Florida:											
Miami	0		0	0	1	0	0	2	0	0	20
Tampa	3		0	0	0	0	0	1	0	0	23
Kentucky:											
Ashland	2			0		5	0		0	0	
Lexington	2		0	0	2	1	0	1	0	1	12
Louisville	26	2	0	0	12	18	0	8	1	1	104

City reports for week ended Nov. 18, 1933—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Small-pox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths all causes
		Cases	Deaths								
Tennessee:											
Memphis.....	9		2	0	13	7	0	2	1	1	96
Nashville.....	5		0	0	3	11	0	1	2	17	
Alabama:											
Birmingham.....	6		1	1	6	10	0	3	1	2	67
Mobile.....	1		1	0	2	0	0	1	0	0	21
Montgomery.....	2		0	0		2	0		0	1	
Arkansas:											
Fort Smith.....	7			0		1	0		0	1	
Little Rock.....	3		0	1	4	1	0	2	0	1	7
Louisiana:											
New Orleans.....	11	4	5	2	12	13	0	9	0	1	174
Shreveport.....	6		0	0	4	3	0	1	0	0	50
Texas:											
Dallas.....	35		0	0	10	7	3	1	1	0	68
Fort Worth.....	16		0	0	4	7	0	2	0	0	32
Galveston.....	1		0	0	3	1	0	2	0	0	18
Houston.....	27		0	0	6	5	0	3	0	0	69
San Antonio.....	8		2	0	5	4	0	6	2	0	63
Montana:											
Billings.....	0		0	0	0	0	0	0	0	0	7
Great Falls.....	0		0	0	2	0	0	0	1	7	8
Helena.....	0		0	0	0	0	0	0	0	0	1
Missoula.....	0		0	0	0	0	0	0	0	0	2
Idaho:											
Boise.....	0		0	0	0	2	0	0	0	0	6
Colorado:											
Denver.....	1	31	1	2	5	12	2	2	2	40	62
Pueblo.....	0		0	0	0	0	0	0	0	2	5
New Mexico:											
Albuquerque.....	1		0	0	0	3	0	2	0	1	6
Utah:											
Salt Lake City.....	0		0	40	3	6	0	0	1	8	30
Nevada:											
Reno.....	0		0	0	0	0	0	0	0	0	2
Washington:											
Seattle.....	0			1		12	0	2	3	32	73
Spokane.....	0			33	3	6	0		0	0	25
Tacoma.....	1		1	0	2	4	0	0	0	4	28
Oregon:											
Portland.....	0		0	1	7	16	3	0	0	2	73
Salem.....	0	1	0	1	0	0	0	0	0	0	0
California:											
Los Angeles.....	28	37	2	9	12	76	4	17	3	46	312
Sacramento.....	1		1	0	1	5	0	4	0	0	40
San Francisco.....	6		1	3	9	9	0	7	0	28	165

State and city	Meningococcus meningitis		Polio-myelitis cases	State and city	Meningococcus meningitis		Polio-myelitis cases
	Cases	Deaths			Cases	Deaths	
Connecticut:							
New Haven.....	1	0	0	Michigan:			
New York:							
New York.....	0	1	1	Detroit.....	1	0	0
New Jersey:							
Newark.....	1	0	0	Maryland:			
Pennsylvania:							
Philadelphia.....	3	2	0	Cumberland.....	0	0	1
Indiana:							
Indianapolis.....	2	0	0	West Virginia:			
Illinois:							
Chicago.....	6	1	1	Charleston.....	0	0	1
Alabama:							
Texas:							
California:							
Birmingham.....							
Dallas.....							
Los Angeles.....							

Lethargic encephalitis.—Cases: Boston, 1; Worcester, Mass., 1; New York, 5; Pittsburgh, Pa., 1; Detroit, 1; Grand Rapids, Mich., 1; St. Louis 4; Topeka, 1; Wheeling, W. Va., 1; Louisville, Ky., 1.

Pellagra.—Cases: New Orleans, 1; Dallas, Tex., 1.

Typhus fever.—Cases: Atlanta, 3; Savannah, 2. Deaths: Savannah, 1.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Two weeks ended November 4, 1933.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the 2 weeks ended November 4, 1933, as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis.....		1	1	1		1				4
Chicken pox.....		1		209	252	100	28	15	63	668
Diphtheria.....			6	86	20	29	1			142
Dysentery.....					1				2	3
Erysipelas.....				3	6	1		3		18
Influenza.....		15		1	6	1			13	36
Lethargic encephalitis.....					2					2
Measles.....		1		54	11	4			19	69
Mumps.....					59	6	19		33	117
Paratyphoid fever.....					3				2	5
Pneumonia.....					8		3		6	17
Poliomyelitis.....			1	8	3	1	1	4		18
Scarlet fever.....	1	18	25	200	151	44	8	8	104	559
Trachoma.....							3		22	25
Tuberculosis.....	2	4	11	77	114	2	5	3	33	251
Typhoid fever.....	1	4	3	77	33	5		1	2	126
Undulant fever.....					4					4
Whooping cough.....		25	5	103	141	44	16	1	21	356

Quebec Province—Communicable diseases—Two weeks ended November 18, 1933.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the 2 weeks ended November 18, 1933, as follows:

Disease	Cases	Disease	Cases
Chicken pox.....	326	Poliomyelitis.....	6
Diphtheria.....	57	Puerperal septicemia.....	1
Erysipelas.....	7	Scarlet fever.....	146
German measles.....	4	Tuberculosis.....	102
Influenza.....	4	Typhoid fever.....	49
Measles.....	266	Whooping cough.....	277
Ophthalmia neonatorum.....	3		

ITALY

Communicable diseases—Four weeks ended May 28, 1933.—During the 4 weeks ended May 28, 1933, cases of certain communicable diseases were reported in Italy as follows:

Disease	May 1-7		May 8-14		May 15-21		May 22-28	
	Cases	Com- munes affected	Cases	Com- munes affected	Cases	Com- munes affected	Cases	Com- munes affected
Anthrax.....	7	7	15	15	15	14	18	15
Cerebrospinal meningitis.....	11	10	14	12	5	5	7	6
Chicken pox.....	469	124	445	151	442	157	285	117
Diphtheria and croup.....	428	241	477	268	495	236	417	228
Dysentery.....	2	1	11	8	11	6	7	5
Lethargic encephalitis.....							3	3
Measles.....	1,604	275	1,860	290	1,945	315	1,605	269
Poliomyelitis.....	4	4	8	6	5	5	3	3
Scarlet fever.....	261	142	399	125	363	129	577	186
Smallpox.....					3	1		
Typhoid fever.....	162	100	253	157	273	165	235	140

MEXICO

Vera Cruz—Reportable diseases—April-June 1933.—During the 3 months, April, May, and June 1933, the following diseases have been reported in Vera Cruz, Mexico:

Disease	April 1933		May 1933		June 1933	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Anthrax.....		1	2			
Bronchitis.....		4		1		6
Cancer.....		4		5		8
Chicken pox.....	5				1	
Conjunctivitis (infectious).....	1		1			
Diphtheria.....	3		2	1	2	
Dysentery.....	9	3	15	1	10	3
Erysipelas.....		1	1			1
Favus.....	4		2			
Gangrene.....		1				
Gastroenteritis.....		23		21		42
Hookworm disease.....		2		3		1
Influenza.....	1	1		1		
Jaundice.....		1				1
Malaria.....	80	4	150	11	130	7
Measles.....	7			4	5	5
Meningitis.....		2		3		
Peritonitis.....		1				1
Pernicious anemia.....				1		
Pleurisy.....		2				
Pneumonia.....		7		8		7
Poliomyelitis.....					1	1
Septicemia.....		1				
Septic sore throat.....					1	
Syphilis, hereditary.....		3		3		6
Tetanus.....		3		2		
Tuberculosis.....	22	19	26	15		19
Typhoid fever.....	7	1	5	1	12	3
Whooping cough.....					1	

VIRGIN ISLANDS

Notifiable diseases—August–October 1933.—During the months of August, September, and October 1933, cases of notifiable diseases were reported in the Virgin Islands, as follows:

Disease	Cases		
	August 1933	September 1933	October 1933
Chancroid.....		1	
Chicken pox.....		1	
Filariasis.....	1	2	34
Gonorrhoea.....	2	3	2
Leprosy.....	1		1
Malaria.....	87	39	31
Paratyphoid fever.....		1	
Pellagra.....	1		
Syphilis.....	5	16	12
Tuberculosis.....	1	3	1
Typhoid fever.....			2
Uncinariasis.....	1	1	1

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

(NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for Nov. 24, 1933, pp. 1431-1442. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued Dec. 29, 1933, and thereafter, at least for the time being, in the issue published on the last Friday of each month.)

Cholera

Philippine Islands.—During the week ended November 25, 1933, cholera was reported in the Philippine Islands as follows: Antique Province, Dao, 6 cases, 5 deaths. Bohol Province—Antequera, 5 cases, 4 deaths; Balilihan, 5 cases, 5 deaths; Clarin, 3 cases, 2 deaths; Mabini, 5 cases, 3 deaths; Tubigon, 50 cases, 27 deaths. Cebu Province—Argao, 4 cases, 3 deaths; Campostela, 1 case, 1 death; Carcar, 1 case, 1 death; Cebu City, 1 case; Liloan, 2 cases, 2 deaths; Minglanilla, 3 cases, 2 deaths; Naga, 7 cases, 1 death; Toledo, 4 cases, 3 deaths. Iloilo Province—Iloilo, 1 case, 1 death.

Plague

Manchuria.—According to latest information, dated October 23, 1933, there were 187 cases of plague in the vicinity of Tungliao, Manchuria, up to October 14, 1933, of which all but 2 or 3 percent were fatal.

In the Nungan District of Kirin Province there were 436 deaths from bubonic plague up to October 11, 1933. In Fujū near Nungan there were 2 deaths up to October 3, and in Changling 17 cases, of which 14 were fatal.

In the Taonan area up to October 12, 1933, 15 deaths from plague occurred at Hunghsing, 23 deaths at Chanyu, and 1 case at Taonan. At Kaolipan, 50 miles southwest of Taonan, there had been about 200 cases of plague.

Yellow Fever

Nigeria—Kano.—On November 4, 1933, 1 case of yellow fever occurred at Kano, Nigeria.